

Q. 1. Give the occurrence, biological role and structural features of ~~st~~ sterol.

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Occurance:-

- sterols are found in animals and plant and fats.
- The main source of cholesterol are brain spinal cord, gallstone & fish liver oil.
- ergosterol occurs in both plants and animals.

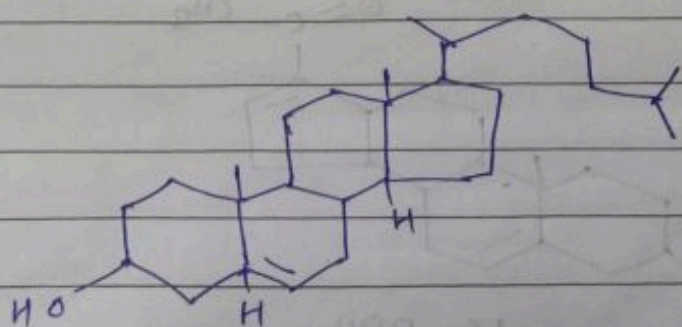
Biological role &

- In the body, the majority of cholesterol is associated with cell membranes.
- Where it has an important role in maintaining fluidity.
- Polar - OH group is oriented towards aqueous media inside cell.

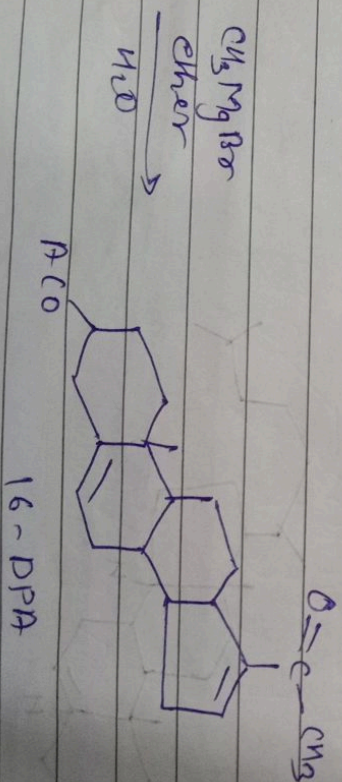
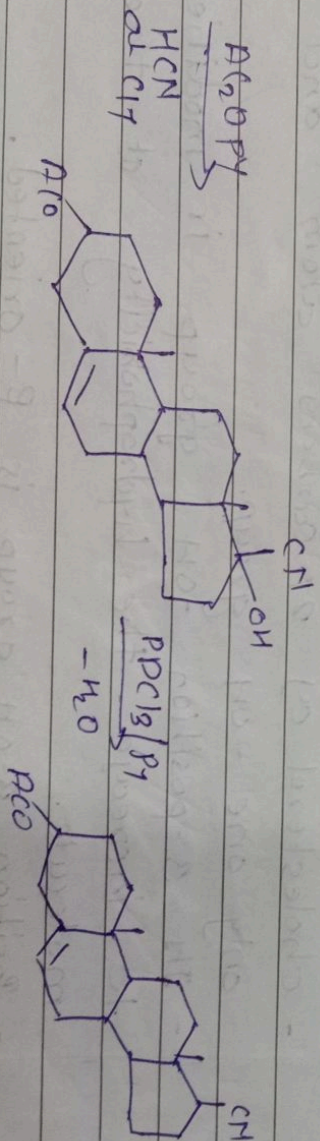
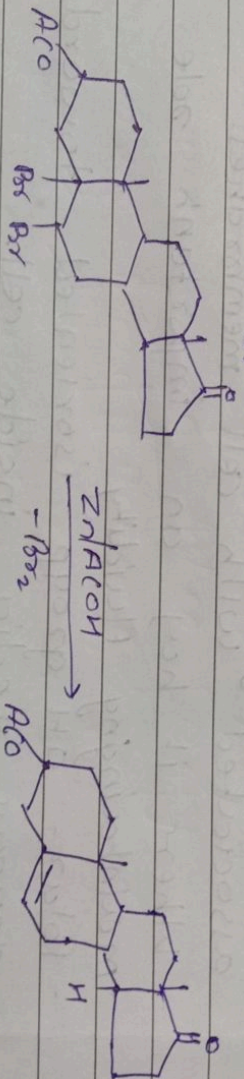
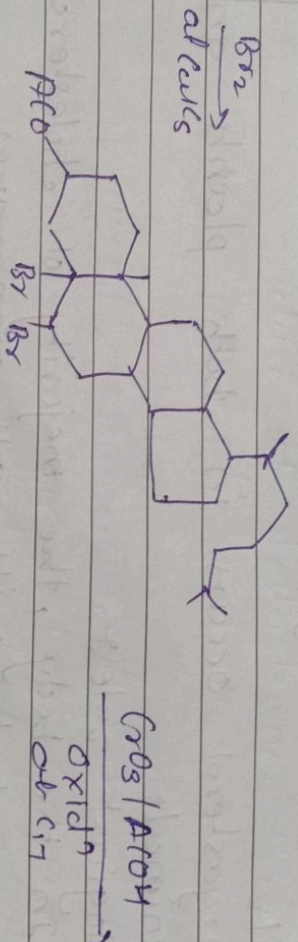
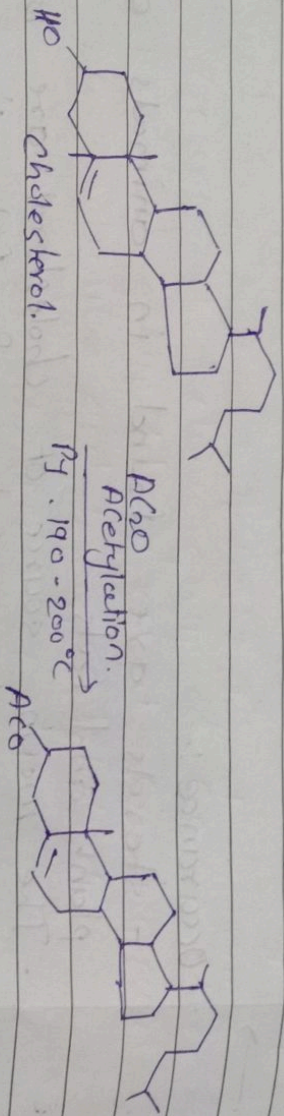
Structural features &

- cholesterol has 27 carbon atoms and only one -OH group.
- The 3-position -OH group is modified to increase the hydrophobicity of the molecule.
- Position 3-OH group is β -oriented.

Structure-



Q.2. Synthesis of 16 DPA from cholesterol.



Q.3 Discuss the occurrence, biological role and structural features of corticosteroids.

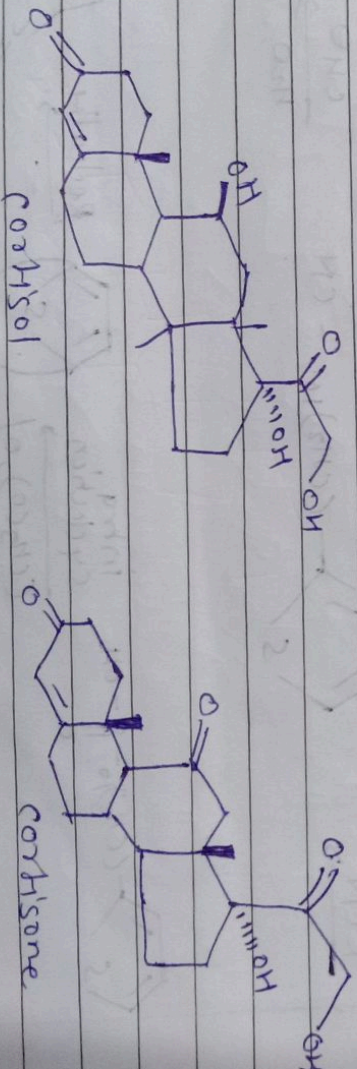
Occurrence

- The adrenal glands of mammals are located near each kidney and consist of two distinct parts medulla and cortex.
- The medulla produces adrenaline while cortex produces corticosteroids.

Biological role.

- They are used to reduce inflammation i.e. they act as anti-inflammatory.
- The deficiency of hormones produces a number of disturbance in metabolism of water, electrolyte carbohydrate and proteins.
- Mineralocorticoids are responsible for maintaining sodium - potassium balance in body.
- Over production of adrenal substances in children, results in precocious sexual development.

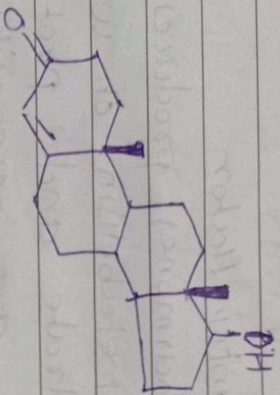
Structural features.



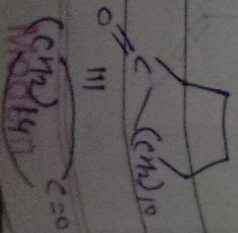
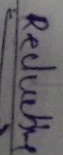
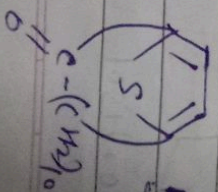
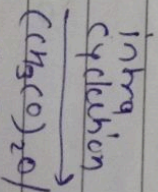
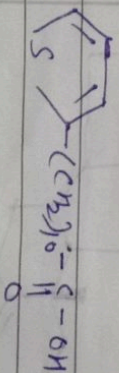
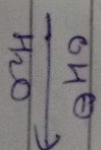
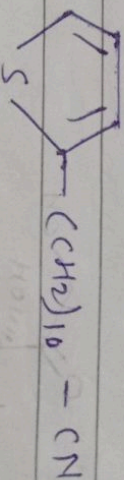
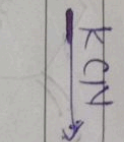
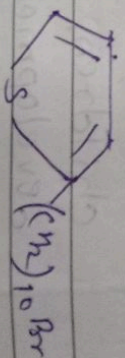
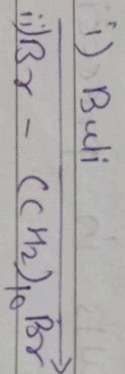
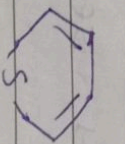
- Presence of α, β unsaturated ketonic group
- double bond b/w C_4-C_5 & ketonic group at C_3
- Presence of ketonic group at C_{20} & other functional group like -OH at C_{17} increases nu. retention and for carbohydrate metabolism.

Q.4. Draw structure of testosterone. How is exaltone synthesized.

Structure of testosterone.



Synthesis of exaltone.



Q.5 Give sources and biological importance of vit B₆.

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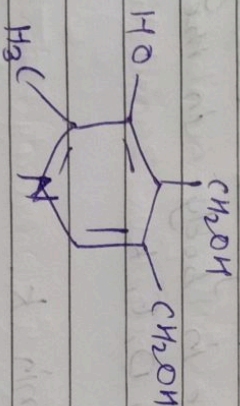
Sources & - vitamin B₆ occurs in cereals, molasses, yeast.

- other sources are rice polishing, maize, milk egg, fish liver and fresh vegetables.

Biological importance:

- It is useful for the treatment of nausea and vomiting during pregnancy.
- Used to treat dermatitis.
- Prevents nervous and skin disorders.
- It helps in metabolism of fats and proteins.
- e.g. pyridoxine.

Structure:



Q.6. How are vitamins classified? Give synthesis of vitamin K and state its biological importance.

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- Vitamins are organic substances required in very small amounts of growth and maintenance of health of all body animals.

They are mainly classified into two groups:

① Water soluble vitamins.

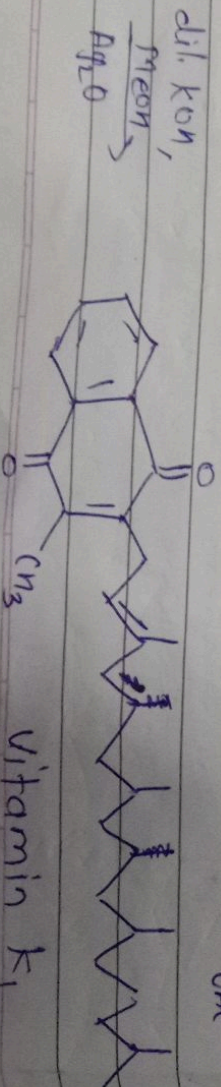
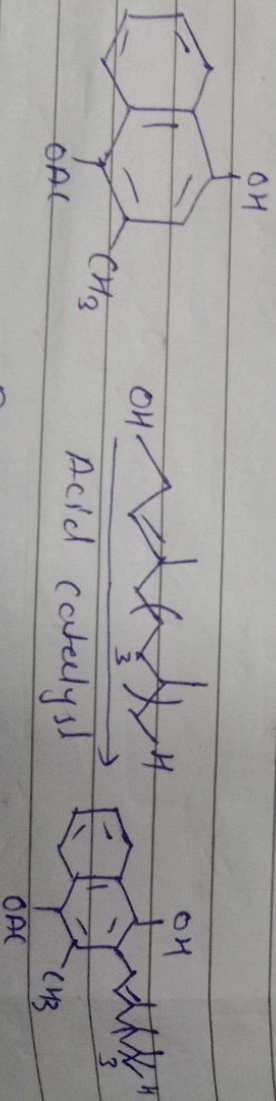
- They are soluble in water and part of them is lost during heating (boiling).
- They can't be stored in body and hence have to be taken every day.

e.g. vitamins B and vitamin C.

② Fat soluble vitamins:

- They are soluble in organic solvent and fats.
- They are not easily lost during cooking and can be stored in body in the liver.
- Ex. vitamins A, D, E, K.

Synthesis of vitamin K.



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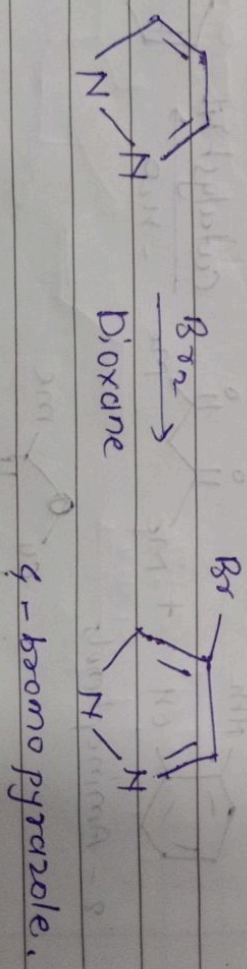
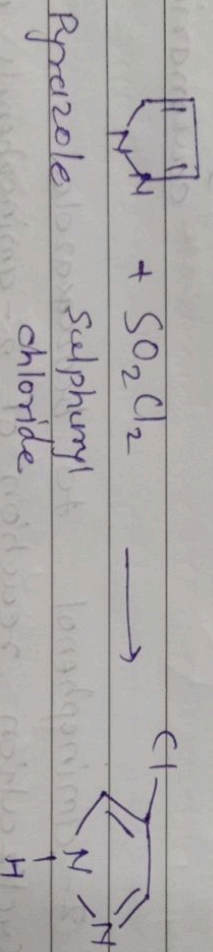
Biological importance:

- Helps in clotting of blood.
- Normal functioning of liver
- Prevention of post operative haemorrhage.

Q. 4. Explain. Electrophilic substitution of pyrazole
take place at position 4, Justify your answer.
on basis of stability of intermediate.

Pyrazole are subjected to electrophilic
substitution at attack take place at
position 4.

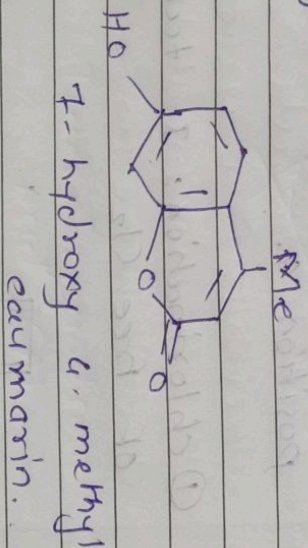
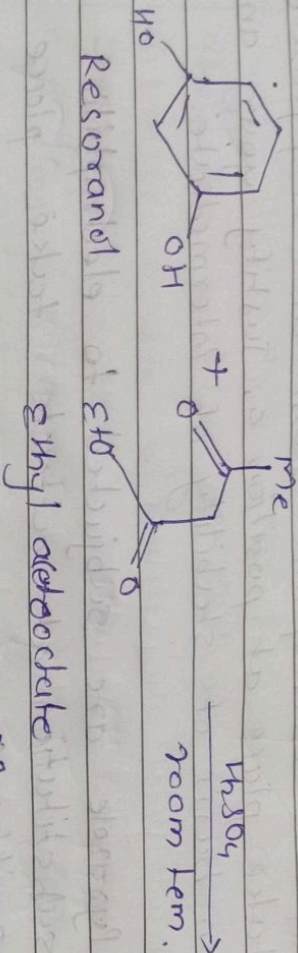
① Chlorination: It take place in presence
of free Cl_2



Q.8. Conversion

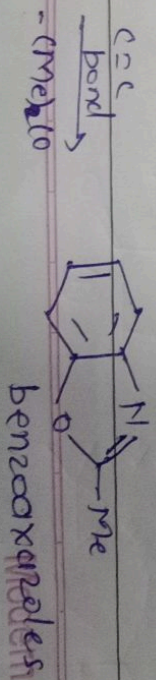
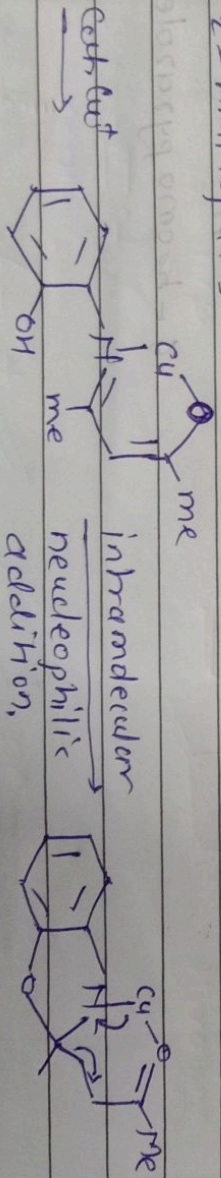
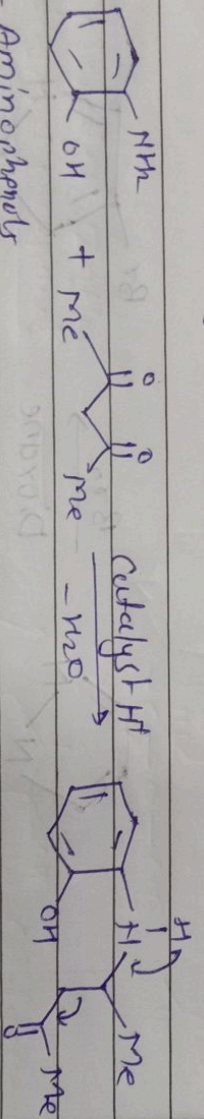
- i) Resorcinol to Caumarin.
- ii) 2-aminophenol to benzoxazole.

i) Resorcinol to Caumarin.



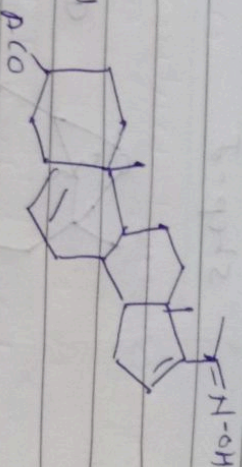
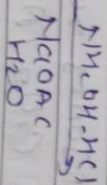
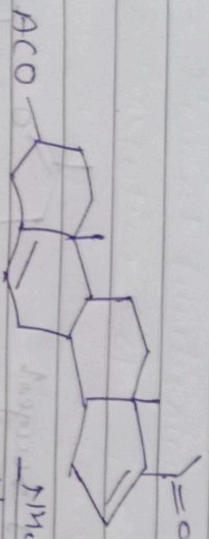
ii) 2-aminophenol to benzoxazole.

- Cyclization reaction at 2-aminophenols with β -diketones catalyzed by Cl combination of Brosted acid and Cu give various 2-substituted benzoxazole.



Q.9 How is androstosterone synthesized from 16-DPA

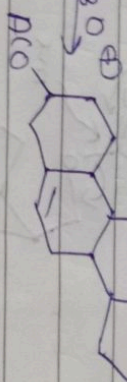
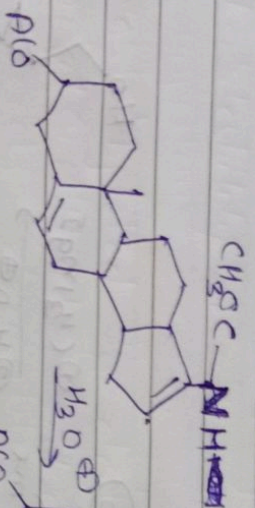
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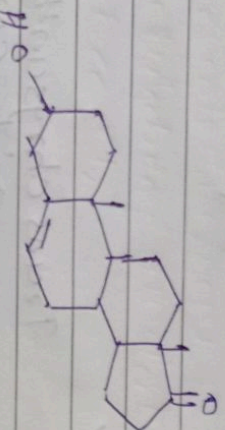
Beckmann rearrangement

PbCl₂

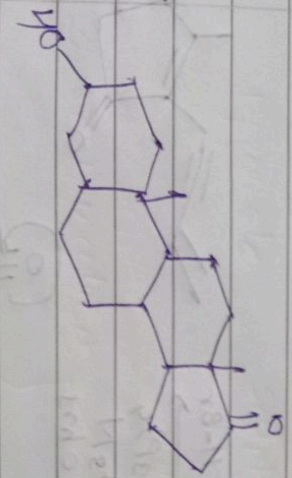
Beckmann rearrangement



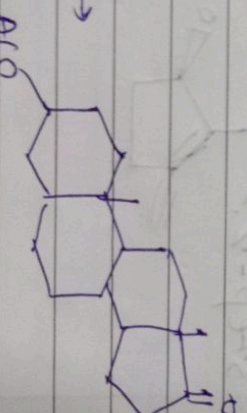
HgO²⁺



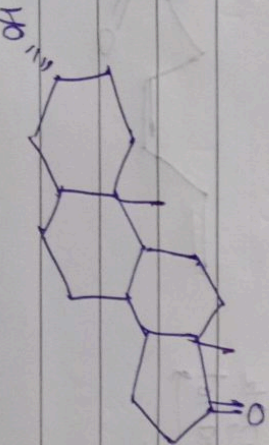
Red¹ H₂/Pd.



AcOH



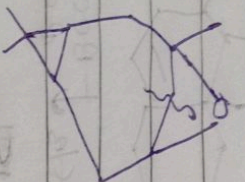
Maddal⁹ Intension Hydrolysis.



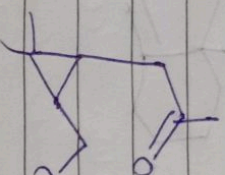
Androstosterone

Q.10 Give the synthesis of pyrethrin-I

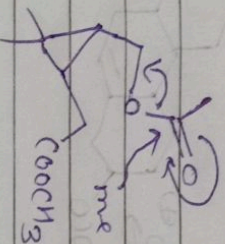
Step-1



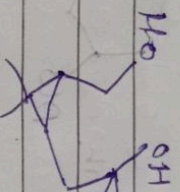
① Jones reagent
CrO₂/AcOH
② CH₃OH, HCl



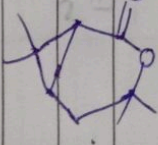
CH₃COOH
Pyrethrinic acid



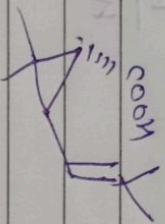
① (CH₃)₂NI
② H₂O⁺



PTSA
CrO₃

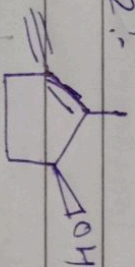


2KOH
Ethylene glycol

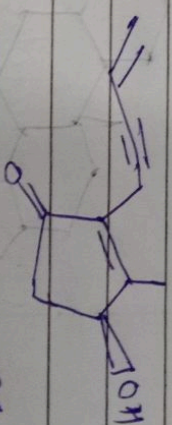


Trans chrysanthemic Acid (A)

Step-2:-

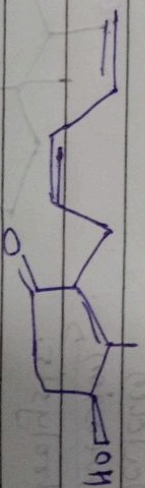


CH₂=CH-Br
Pd (Ph₃P)₄
CuI, Et₃N
20°C, 20 hrs



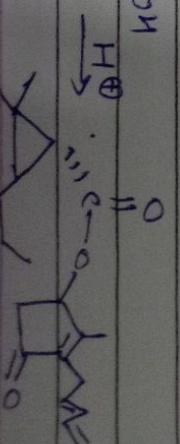
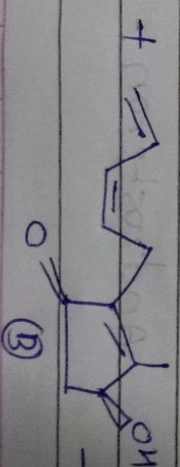
CH₃COOH
Pyrethrinic acid

Activated Zn/H₂
dust, 1 propanol
100°C, 30 hrs



(S)-pyrethrolone (B)

Step-III:-



Pyrethrin-I